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U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER
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**TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371**

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)

09/555557

INTERNATIONAL APPLICATION NO.
PCT/EP98/07660

INTERNATIONAL FILING DATE
(27.11.98)
27 November 1998

PRIORITY DATES CLAIMED
(01.12.97)
1 December 1997

TITLE OF INVENTION

METHOD FOR VISUAL DISPLAY UNIT-BASED DEFINITION AND PARAMETRIZATION OF INTERFACES

APPLICANT(S) FOR DO/EO/US

GIKAS, Diamantis; KLOSE, Ralf; JACHMANN, Thomas and HEINDL, Elisabeth

Applicants herewith submit to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
 2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
 3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) immediately rather than delay applicable time limit set in 35 U.S.C. examination until the expiration of the 371(b) and PCT Articles 22 and 39(1).
 4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
 5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
 6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
 7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
 8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
 9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). (Unsigned)
 10. ☒ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).
- Items 11. to 16. below concern other document(s) or information included:**
11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
 12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
 13. ☒ A **FIRST** preliminary amendment.
 - ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
 14. ☐ A substitute specification.
 15. ☐ A change of power of attorney and/or address letter.
 16. ☒ Other items or information: Preliminary Examination Report and Search Report.

Express Mail No.:

EL 169612481us

09/555557

- 17.
- ☒
- The following fees are submitted:

Basic National Fee (37 CFR 1.492(a)(1)-(5)):

Search Report has been prepared by the EPO or JPO \$840.00
 International preliminary examination fee paid to USPTO (37 CFR 1.492) \$670.00
 No international preliminary examination fee paid to USPTO (37 CFR 1.492) but
 international search fee paid to USPTO (37 CFR 1.445(a)(2)) \$760.00
 Neither international preliminary examination fee (37 CFR 1.492) nor international
 search fee (37 CFR 1.445(a)(2)) paid to USPTO \$970.00
 International preliminary examination fee paid to USPTO (37 CFR 1.492) and all
 claims satisfied provisions of PCT Article 33(2)-(4) \$96.00

CALCULATIONS | PTO USE ONLY

ENTER APPROPRIATE BASIC FEE AMOUNT =

\$ 840

Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months
 from the earliest claimed priority date (37 CFR 1.492(e)).

\$

Claims	Number Filed	Number Extra	Rate		
Total Claims	7 - 20 =	0	X \$18.00	\$ 0	
Independent Claims	1 - 3 =	0	X \$78.00	\$ 0	
Multiple dependent claim(s) (if applicable)			+ \$260.00	\$	

TOTAL OF ABOVE CALCULATIONS =

\$ 840

Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity statement must
 also be filed. (Note 37 CFR 1.9, 1.27, 1.28).

\$

SUBTOTAL =

\$ 840

Processing fee of \$130.00 for furnishing the English translation later the ☐ 20 ☐ 30
 months from the earliest claimed priority date (37 CFR 1.492(f)).

\$

TOTAL NATIONAL FEE =

\$ 840

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be
 accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +

\$

TOTAL FEES ENCLOSED =

\$ 840

Amount to be:
 refunded \$

charged \$

- a. ☐ A check in the amount of \$_____ to cover the above fees is enclosed.
- b. ☒ Please charge my Deposit Account No. 11-0600 in the amount of **\$840.00** to cover the above fees.
 A duplicate copy of this sheet is enclosed.
- c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to
11-0600. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a)
 Deposit Account No. or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Kenyon & Kenyon
 One Broadway
 New York, New York 10004

SIGNATURE

Richard L. Mayer, Reg. No. 22,490
 NAME

DATE

5/31/00

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s) : Diamantis GIKAS et al.
Serial No. : To Be Assigned
Filed : Herewith
For : METHOD FOR VISUAL DISPLAY UNIT-BASED
DEFINITION AND PARAMETRIZATION OF
INTERFACES
Examiner : To Be Assigned
Art Unit : To Be Assigned

Assistant Commissioner
for Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT

SIR:

Kindly amend the above-identified application before
examination, as set forth below.

IN THE TITLE:

Please replace the title with the following new
title:

--METHOD FOR VISUAL DISPLAY UNIT-BASED DEFINITION AND
PARAMETRIZATION OF INTERFACES--.

IN THE SPECIFICATION:

Please amend the specification as follows:

Delete line 1, and insert:

--FIELD OF THE INVENTION--.

On page 1, before line 7, insert:

--BACKGROUND INFORMATION--.

On page 2, before line 18, insert:

--SUMMARY--.

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On page 2, line 18, change "The" to --An--, and change "specify" to --provide--.

On page 2, line 19, change "VDU-based" to --visual display unit ("VDU")-based--.

On page 2, line 30, change ", the" to --. The--.

On page 2, line 33, change "being" to --is--.

On page 2, line 35, change "being" to --is--.

On page 3, line 34, change "I.e." to --That is--.

On page 3, delete line 37.

On page 4, delete lines 1-13, and insert:

--BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows a first screen display during use of a method for parameterizing a software interface according to the present invention.

Figure 2 shows a second screen display during use of the method for parameterizing a software interface according to the present invention.

DETAILED DESCRIPTION--.

On page 4, line 15, change "the" to --a--.

On page 5, line 31, change "Completely analogously" to --Analogously--.

On page 6, line 1, change "Besides, provision" to --Provision--.

On page 7, line 3, change "Variably" to --Variable--.

On page 7, line 4, change "exemplarily" to --
example--.

On page 7, line 6, delete "again".

On page 7, line 8, delete "already".

On page 7, line 10, change "exemplarily" to --as an
example--.

On page 7, line 16, change "shown" to --exhibited--.

On page 8, line 25, delete "essentially".

On page 9, line 22, change "symbology" to --symbols--.

On page 10, line 22, change "obvious" to --clear--.

On page 10, line 37, change "goes by" to --is--.

On page 11, delete line 6 and delete blank line 7.

On page 11, line 8, before "In" insert --variables
are listed in a name column 9.--.

On page 12, line 2, change "is" to --may be--.

On page 12, line 33, change "Till now, it has been
assumed that" to --Accordingly,--.

On page 12, line 34, change "is" to --may be--, and
delete "only".

On page 13, delete line 1, and insert:
--Additionally, according to the present invention,--.

On page 13, line 2, delete "invention to make it
possible for".

On page 13, line 3, change "to" to --may--.

On page 13, line 5, change ", using a method which is" to ---.

On page 13, delete line 6.

On page 13, line 23, delete "essentially".

IN THE ABSTRACT:

Please amend the abstract as follows:

Line 4, change ", " to ---.

Line 5, change "the" to --The--, change "being" to --is--, and change "interfaces" to --interface--.

Line 7, change ", " to ---.

Line 8, change "provision being made for a" to --A--, and change "(1)" to --is provided--.

Line 13, delete "(2)".

Line 15, delete "(3)".

Delete line 17.

IN THE CLAIMS:

Please cancel, without prejudice, claims 1-5 in the underlying PCT application PCT/DE98/07660.

Please cancel, without prejudice, claims 1-4 in the annex to the International Preliminary Examination Report ("IPER").

Please add the following new claims:

5. (New) A method for visual display unit-based definition and parametrization of a software interface of a software component of an industrial automation system, the software interface having interface parameters, the method comprising:

providing a display window which can be divided vertically or horizontally;

displaying in a first partial window of the display window a hierarchical structure of the interface parameters of the software component;

selecting one of the interface parameters using a movable cursor; and

displaying in a second partial window of the display window a detail display of the selected interface parameter, the detail display including a display of at least one attribute of the selected interface parameter and allowing the definition and parametrization of the attribute.

6. (New) The method according to claim 5, further comprising:

for each one of the at least one attribute,

providing a name portion and a data portion, the name portion for identifying the one of the at least one attribute, the data portion being scrollable horizontally if a graphical representation of the data portion requires more space than a space offered by the display window or the display unit, a graphical representation of the name portion being stationary.

7. (New) The method according to claim 6, further comprising:

arranging the name portion and the data portion in vertical columns, the vertical columns being arranged side by side.

8. (New) The method according to claim 6, further comprising:

arranging the name portion and the data portion in horizontal rows, the horizontal rows being arranged one below another.

9. (New) The method according to claim 6, further comprising:

dividing the data portion into columns or rows.

10. (New) The method according to claim 7, wherein a sequence of the vertical columns is freely selected and stored by a user.

11. (New) The method according to claim 8, wherein a sequence of the horizontal rows is freely selected and stored by a user.

REMARKS

This Preliminary Amendment cancels, without prejudice, claims 1-5 in the underlying PCT Application No. PCT/EP98/07660. This Preliminary Amendment further cancels, without prejudice, claims 1-4 in the annex to the IPER, and adds new claims 5-11. The new claims, inter alia, conform the claims to U.S. Patent and Trademark Office rules and do not add new matter to the application.

The above amendments to the title, the specification and the abstract are, inter alia, to conform the title, the specification and the abstract to U.S. Patent and Trademark Office rules and to correct informalities. The amendments to the title, the specification and the abstract do not add new matter.

The underlying PCT application includes an International Search Report dated May 7, 1999. An English translation of the search report is included herewith.

The underlying PCT application includes an IPER dated March 7, 2000. An English translation of the IPER and the annex thereto is included herewith.

It is respectfully submitted that the subject matter of the present application is new, non-obvious, and useful. Prompt consideration and allowance of the application are respectfully requested.

Respectfully submitted,

KENYON & KENYON

Dated:

5/31/00

By:

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A. C. C. C. C.

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2/PAGE 1

METHOD FOR VISUAL DISPLAY UNIT-BASED DEFINITION AND
PARAMETRIZATION OF INTERFACES

Description

The present invention relates to a method for visual display unit-based definition and parametrization of interfaces of the software components of an industrial automation system.

In the course of the increasing modularization of software components, the organization of related data and operations in structures intended for this by the respective programming languages has acquired prominence as the standard. For the "higher" programming languages, these structures are, on a lower level, the "procedures" or "functions", related procedures or functions in each case being combined, for example, in a module, and related modules possibly being combined in a "collection", and the modules or the possibly existing collections finally being combined into the executable application.

The data exchange between the described structures is carried out via predefined or predefinable interfaces. As an example, a function will be discussed which ascertains the weekday that corresponds to a preselected date. The date in question is to be transferred to this function as parameter, whereas the weekday corresponding this date is returned by the function as result. In this context, the definable or predefined interface, on one hand, makes the memory location available via which this data can be exchanged and, on the other hand, guarantees the consistency of the data, for example, by carrying out a type test which, in the presently discussed case, ensures that the function does not ascertain the supposed weekday corresponding to a text string transferred as parameter.

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In the present case, thus, a memory location which is suitable for receiving a representation representing the date, as well as a further memory location which is suitable for receiving a representation of the weekend returned as result are required.

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A basically comparable constellation is also found in automation projects, the specific software components being organized, for example, according to the process periphery to be controlled and/or monitored. The structures used in a programming language, for example, Step® 5 or Step® 7 (registered trademarks of SIEMENS AG), which is common for automation projects, are called function blocks or operation blocks. These blocks have interfaces, as well, via which they can be parameterized, via which specific actions can be occasioned, via which specific internal data of the block or process-related data can be interrogated, etc.

The object of the present invention is to specify a particularly user-friendly method for VDU-based definition and parametrization of interfaces of the software components of an automation system.

For a method for VDU-based definition and parametrization of interfaces of the software components of an industrial automation system, the interface being a software interface having at least one interface parameter, the interface parameter being further characterized by at least one attribute, this object is achieved by making provision for display window which can be divided vertically or horizontally, the hierarchical structure of the interface parameters of the respective software components of the automation system, which parameters can be selected using a movable cursor, being displayed in a first partial window of the display window, and the at least one attribute of the selected interface parameter being displayed in a second partial window of the display window.

If the attributes of the selected interface parameter or of the selected interface parameters are displayable and/or editable, a user-friendly representation of the parameters can be called up at all times, or the interface parameters can be edited directly on the screen at all times, respectively.

If the attributes have a name portion and a data portion, the name portion being used for identifying the attribute, and the data portion being scrollable horizontally if its graphical representation requires more space than that offered by the display window or the display unit, the allocation of data to the name portion is visible on the screen at all times provided that the graphical representation of the name portion is stationary.

If the name portion and the data portion are arranged in vertical columns arranged side by side or in horizontal rows arranged one below the other, respectively, the data portion possibly being divided into columns or rows of its own, name portion and data portion are displayed in a particularly clear manner.

If the sequence of the columns or of the rows of the data portion can be freely selected and, in particular also stored by the user, it is possible for the user to arrange, for example, the columns which are of interest to him in such a manner that they are visible on the screen at all times, i.e., without having, for example, to scroll the screen contents. If, in addition, the selected sequence is storable, as well, the user finds the previously selected and stored sequence again as soon as he brings up to the screen an interface parameter attribute which has once been organized according to the his desires. This method can be used for each container separately. I.e., the number and the arrangement of the columns can be set for each container separately.

Further features, advantages and uses of the present invention

follow from the subclaims of the following description of an exemplary embodiment on the basis of the drawing and from the drawing itself. In this context, the described and/or graphically illustrated features alone or in arbitrary combination constitute the subject matter of the present invention, independently of their composition in the patent claims, or the relating back of the patent claims.

In this context,

Figure 1 and Figure 2 show a screen display during the use of the method for parameterizing a software interface.

Figure 1 shows the screen display of vertically divided display window 1 which includes first partial window 2 and second partial window 3.

Shown in the left portion of display window 1 is first partial window 2 which depicts the hierarchical structure of software interface 4 of the specific software component 5, i.e., of a function block FB 5, of the automation system. The parameters of the software interface are selectable by a movable cursor 7, for example, by a cursor which is influenced by a movable input device such as a "mouse".

With respect to a selected interface parameter 6, a detail display 4' ensues in the right portion of display window 1, i.e., in second partial window 3, detail display 4' yielding a display which is adjusted to the type of selected interface parameter 6, and which is described further below. The textual designation of the hierarchical position of selected interface parameter 6 is displayed in the title line of second partial window 3 for identifying at all times the connection between the two representations 4, 4' of the software interface and of the selected window, respectively.

The VDU-based parametrization according to the present invention always relates to exactly one software component of the automation system. This software component is, for example, the currently processed software component, the method according to the present invention being initiatable, for example, by a special dialog during the processing of the software component. However, the interface to be parameterized can also be selected using a method in accordance with the method according to the present invention itself. This aspect of the present invention will be described further below, as well.

Figure 1 shows an exemplary representation of interface 4, 4' of a function block FB 5, the interface including different data areas represented by corresponding structures.

Structures are basically combined, user-defined data types which, together with the access functions possibly defined for them, are designated as abstract data types, the combination of data types and access functions being designated as class or object. Here, the description is continued for the case that user-definable structures or predefined structures exist; however, the scope of the invention includes, of course, also the use of abstract data types, classes or objects. Today, the term container is frequently used as common generic term for the specified structures, as well.

Interface 4, 4' of function block FB 5 first of all includes a container by which data can be transferred to function block FB; this is the container which carries textual designation "IN" in Figure 1. Completely analogously, provision is made for a container by which function block FB can output data to other software components of the automation system; in Figure 1, this container carries textual designation "OUT". Moreover, a container is provided by which a bidirectional data transfer is implemented, i.e., data can both be transferred to function block FB and be output by function block FB; this container

carries textual designation "INOUT". Besides, provision is made for further containers for temporary files "TEMP", constant files "CONST", and for static data "STAT", respectively.

The described containers together form software interface 4 of function block FB. At the same time, these containers represent, in a way, the topmost hierarchical level of software interface 4 and cause the interface parameters to be divided into categories (data input, data output, temporary data, etc.).

If the containers exclusively cause the interface parameters to be grouped logically, the individual interface parameters being arranged in a quasi-parallel manner in the same hierarchical level, this results in that it is not required but not detrimental either to specify such a logical container (e.g., "TEMP") for identifying a variable located at any depth. In such a case, however, in the case of identically named interface parameters which are allocated to logically different containers, name conflicts arise which have to be considered.

Depending on the complexity of the data to be transferred via interface 4, the containers or their underlying structures can be specified, modified or complemented by the user according to his requirements.

For the data to be transferred to function block FB, this is depicted for the hierarchical level subordinate to container "IN".

In the exemplary representation according to Figure 1, structure "IN" includes variables x, y, and z. Variable x is a variable of the boolean type and, consequently, a variable of a simple type whose value, validity range, or the like, can be represented directly, as in the case of other simple types

such as integer, real, float, double, char, etc.

Variably y is a variable of a user-defined data type and, in the exemplarily depicted case, includes the three variables k1, k2, and k3 of the simple data type integer, thus representing a structure again itself.

The structure of variable y is broken down more finely already in first partial window 2 in the representation selected there only exemplarily.

Both in the case of tree-like representation 4 of the hierarchy in first partial window 2 and in second partial window 3 in the detail display 4' which is still to be described later, graphical symbols are used for indicating the specific entries. Thus, in first partial window 2, tree-like structure 4 of the individual hierarchical levels are always represented by corresponding horizontal and vertical lines, the branchings in the tree-like structure being marked by corresponding symbols 8, 8', 8".

In a practical implementation, symbols 8 can, in addition, differ from each other in that they are displayed differently, for example, by displaying an open folder if the branching marked by them is opened, and by displaying a closed folder as long as the branching is masked out.

Thus, the user can recognize directly from the displayed symbology 8 whether or not a selectable item can possibly be graphically expanded, i.e., whether or not it has a possibly displayable subtree.

Both graphical symbols 8, 8', 8" and the designations which are arranged in the screen display in a manner that they neighbor the symbols can be selected by a cursor.

In order not to increase unnecessarily the complexity of the

representation in first partial window 2, provision is made for the number of displayed hierarchical levels to be selectable by the user, i.e., the user can chose which partial trees or branches he wants to be displayed and which not. In this context, the number of displayed hierarchical levels can be set individually, in particular for each branch. For that purpose, a selectable screen object is provided in the hierarchical representation for each branch, i.e., for a displayed structure, the screen object being selectable, for example, by the cursor, a subsequent key stroke displaying the objects, i.e., further structures or variables, which lie hierarchically below this object if they have not been shown before or suppressing the display, if they have been shown before.

A similar behavior is shown, for example, by the "Explorer" of Windows® 95 or Windows NT® (registered trademarks of Microsoft Corporation).

If the graphical symbol 8, 8', 8", or the designation of a container is selected, then this results in that the container or its underlying structure is expanded, and in that the components of the structure are displayed, as well. This happens both in the primarily graphical representation 4 in first partial window 2 and, in addition, in an essentially textual representation 4' in partial window 3, as well.

In this context, partial window 3 is reserved for representing the specific contents of the component selected in partial window 2. If container "IN" is selected in first partial window 2, as exemplarily shown in Figure 1, the contents of selected container 6, i.e., variable x, further structure y, and field z, are displayed in second partial window 3. If, in a next step, such as shown, for example, in Figure 2, structure "y" 6 is selected in first partial window 2, then the contents of now selected structure 6, variables k1, k2, and k3 are displayed.

Only if in first partial window 2, a component is selected which cannot be expanded any more, i.e., a variable which, in a way, forms a leaf, i.e., a "terminal", of the tree-like structure, the structure which the originally selected variable belongs to is displayed in the second partial window, the selection marking in partial window 3 automatically changing to the selected terminal.

The described selection can be carried out in first partial window 2 in a particularly clear manner since the hierarchical dependencies are always represented in the form of a tree-like structure 4 so that, in particular, it is also possible to change from one branch to another without having to initially pass via the common connection hierarchically lying below.

In contrast to that, a selection progressing in the direction of lower hierarchical levels is possible in second partial window 3 (moreover, provision is made for the possibility to change to a higher-level container by a predefinable key, here the "backspace key", as well, provided that such a container exists). For example, in Figure 1, container "IN" 6 is displayed like this in second partial window 3. From symbology 8, 8', 8" of from the likewise indicated data types, it is immediately obvious that variable x is a variable of a simple type and, consequently, cannot be expanded any more. Variables y and z, on the other hand, are expandable. The expansion is activated by selecting the corresponding entries and, for example, when selecting structure y, its components are displayed in second partial window 3, the previous display being replaced. However, it is also conceivable that, in the case of a selection in second partial window 3, the screen contents are not replaced but only covered up, for example, by an additionally opened screen window.

Thus, by positioning cursor 7' on the line in which variable y is displayed in second partial window 3 and a possibly following activation, for example, using the mouse button or

by a key stroke, it is thus possible for structure y to be displayed in a detailed manner, such a selection immediately resulting in a corresponding positioning of cursor 7 onto structure y below container "IN" in first partial window 2.

Figure 2 shows the conditions which ensue both in first and in second partial window 2, 3 in response to the selection of structure y which, in turn, hierarchically belongs to container "IN".

In detail display 4' in second partial window 3, variables k1, k2, and k3 are displayed as components of structure y, the attributes of the displayed interface parameters being displayed simultaneously. Moreover, the attributes of an interface parameter can possibly be edited, as well, provision being made for movable cursor 7' for selecting an interface parameter, the positioning of the movable cursor, in turn, being influenceable by an input device.

In Figure 2, the contents of second partial window 3 differ from those of Figure 1 in that the contents of variable y are now broken down, which is obvious from entry 6 in the title line of second partial window 3, as well. In detail display 4' according to Figure 2, the attributes of variables k1, k2, and k3, which together from structure y, are displayed particularly clearly in a table-like manner, it being possible for an initial value or a comment to be input for each variable separately, i.e., for example, only for k2. In the representation according to Figure 1, a corresponding initial value or a comment would relate to structure y on the whole.

Besides the title line which indicates textual designation 6 of component 6 of software interface 4 from first partial window 2, component 6 being selected by cursor 7, second partial window 3 has in addition a number of vertical columns 9, 10, 11, 12, 13, etc., in which the attributes of the respective variables are represented, and whose number goes by

the number of possible attributes so that possibly a plurality of columns results which, in particular, can no longer be displayed together on the screen or in second partial window 3. In this context, the names, i.e., the plain text designations of the in each case represented structures or variables are listed in a name column 9.

In Figure 1, these are variables x, y, and z as components of structure "IN" or as contents of container "IN"; in Figure 2, these are variables k1, k2, and k3 as components of structure y which, in turn, hierarchically belongs to container "IN". In columns 10, 11, 12, 13 adjoining name column 9 to the right in the representation according to Figure 1 or to Figure 2, respectively, further details, such as the data type and the address, characterizing the respective variable or structure are displayed in relation to the beginning of the structure which is in each case currently displayed in second partial window 3. However, the display can include, for example, details on ranges of validity, as well.

The order of columns 10, 11, 12, 13, etc. is changeable. For that, a dialog which can be inserted on the screen is provided for selecting columns to be displayed or to be masked out, respectively, the order in which columns 10, 11, 12, 13, etc. are displayed can possibly be defined, as well.

Alternatively, provision is made for the title area of respective column 10, 11, 12, 13, i.e., the area in which the plain text designation of the respective column is indicated, i.e., for example, the area with plain text designation "data type" for column 10 to be selectable, the position of respective column 10, 11, 12, 13 then being changeable using the "drag & drop" technique or by a "context menu" intended for this which can be activated, for example, by operating a mouse button.

In this manner, it is possible for columns having particularly

high relevance to be positioned in such a manner that they are permanently displayed on the screen. This is important especially when the dimension of second partial window 3 is not sufficient to display all columns 10, 11, 12, 13, etc, so that the screen contents of second partial window 3 must possibly be scrolled horizontally.

Thus, columns having low relevance can be displaced to a portion of the window which is possibly not visible, the contents of the columns being important only comparatively rarely, so that the user only rarely has to take the effort of scrolling the screen contents.

In order not to make more difficult for the user to relate the displayed information during the possibly required scrolling of the screen contents, provision is made for name column 9 to be stationary. This means the position of name column 9 is always retained during horizontal scrolling, as well, so that the user can always relate the data which is displayed in a line to the respective variable or structure, respectively, which can be recognized by the designation listed in name column 9 since this plain text designation is always found at the beginning of the line in name column 9 which is stationary there.

Thus, because a selection is made either by moving cursor 7 in first partial window 2 or by carrying out this selection by analogous actions or inputs in second partial window 3 using cursor 7', the structure of software interface 4, its layout, and its contents or a possibly defined validity range can be displayed, and specific data possibly be edited, as well.

Till now, it has been assumed that the method according to the present invention is used for checking only the software interface of a previously already selected block, the block having been selected previously, for example, by programming it, possibly using another software tool.

However, it is also part of the subject matter of the present invention to make it possible for the block whose interface is checked to be selected from the set of blocks defined for a software application directly and, consequently, in a significantly more flexible manner, using a method which is analogous to the method according to the present invention.

Completely analogously to the hierarchical structures, dependencies or hierarchical structures of the blocks of a software application can, in fact, be displayed in a tree-like manner, as well, the root of the tree representing the application, i.e., the executable overall program, and the blocks forming the branches of the tree. Possibly, blocks belonging to one another, or the function blocks on one hand and the operation blocks on the other hand can in each case be combined in a common branch from which they then form branchings again, i.e., branches of their own.

The ends of the respective branches then form the interfaces appertaining to the block represented by the branch, the interfaces themselves representing expandable structures. In the end, the possibility of selecting arbitrary interfaces from the software application thus essentially signifies the insertion of at least one additional hierarchical level.

Since the blocks of the software application have bi-unique designations, variables of deeply nested structures of a software interface of a specific block can be related to this block at all times if the designation of this block is carried along for identifying the variable.

While the complete designation of variable k2 as component of structure y which, in turn, hierarchically belongs to container "IN", can be represented as \IN\y\k2, this variable can be represented in a bi-unique manner for the entire software application if, in addition, the name of the specific block, for example, of function block FB10, is also carried

New Patent Claims

1. A method for visual display unit-based definition and parametrization of a software interface of a software component (5) of an industrial automation system,
 - the software interface having at least one interface parameter (6), and
 - the interface parameter (6) being further characterized by at least one editable attribute,characterized in that
 - provision is made for a display window (1) which can be divided vertically or horizontally,
 - the hierarchical structure (4) of the interface parameters (6) of the respective software component (5), which parameters can be selected using a movable cursor (7), being displayed in the first partial window (2) of the display window, and
 - a detail display (4') of the selected interface parameter (6) being displayed in the second partial window (3) of the display window,
 - the detail display (4') including a display of at least one attribute of the selected interface parameter (6) and allowing the definition and parametrization of the attribute.
2. The method as recited in Claim 1,
characterized in that the attributes have a name portion (9) and a data portion (10, 11, 12, 13), the name portion (9) being used for identifying the attribute, and the data portion (10, 11, 12, 13) being scrollable horizontally if its graphical representation requires more space than that offered by the display window (1) or the display unit, the graphical representation of the name portion (9) being stationary.

3. The method as recited in Claim 2, characterized in that the name portion (9) and the data portion (10, 11, 12, 13) are arranged in vertical columns arranged side by side or in horizontal rows arranged one below the other, the data portion (10, 11, 12, 13) possibly being divided into columns or rows of its own.

4. The method as recited in Claim 3, characterized in that the sequence of the columns or rows can be freely selected and, in particular stored by the user.

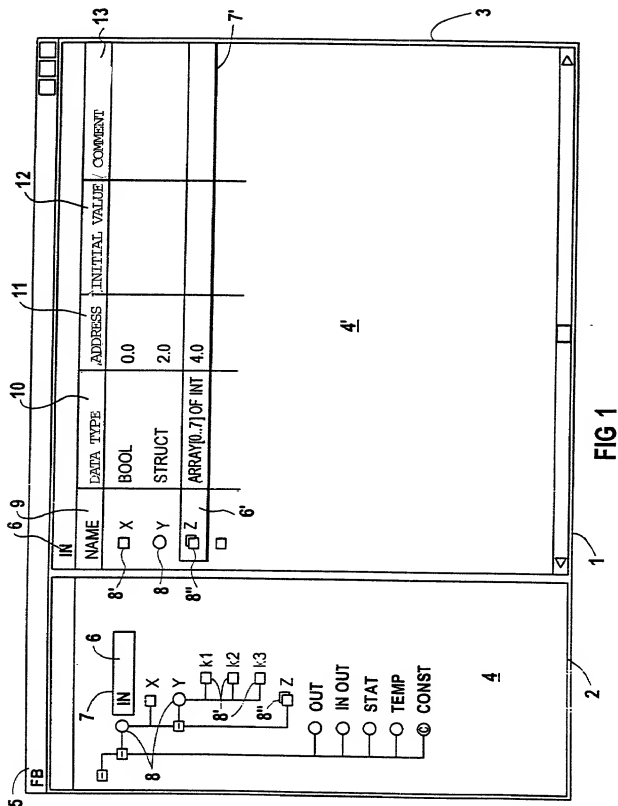
Siemens 67190/973904
Translation JFS x6461

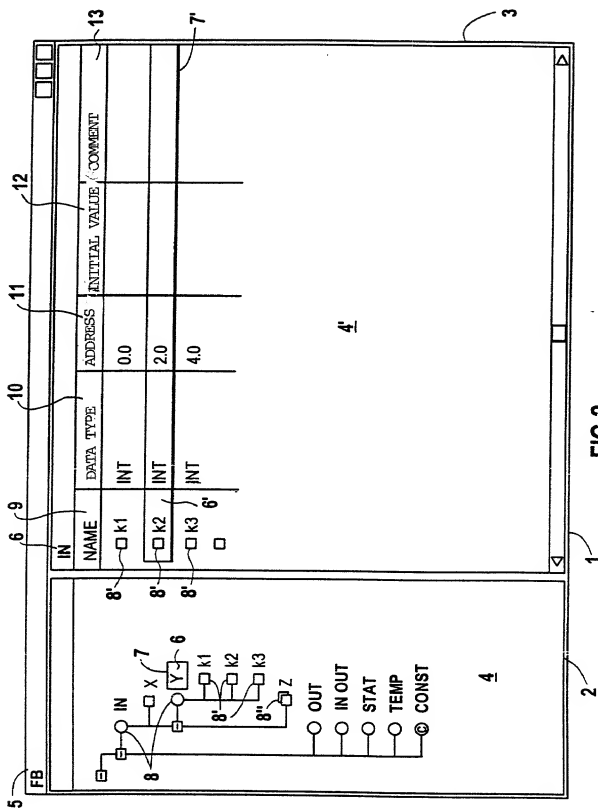
Translation of Article Abstract

Improved Human-Machine Interface for Process Control in the Control Room of a Power Station

The power station control room is the connecting link between man and machine; it is the central location from which the control-room attendant can observe the process, and from where he or she can purposefully intervene in the process events. This is accomplished to a large extent by VDU-based¹ operator communication and monitoring systems, which are presently an integral part of any control-design principle. With the operator communication and monitoring system OS 265-6, the process control system TELEPERM® ME provides the user with a process control component, with which new techniques can be used for improved functionality of the human-machine interface. This is accomplished through high system performance, mature [proven] operator prompting [guidance], comfortable operating instruments, and window-supported functions for process control.

¹ **Translator's Note:** VDU stands for video display unit.





DECLARATION AND POWER OF ATTORNEY

As a below named inventor, hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled **METHOD FOR VISUAL DISPLAY UNIT-BASED DEFINITION AND PARAMETRIZATION OF INTERFACES**, for which an application for Letters Patent was filed as PCT Application No. **PCT/EP98/07660** on **November 27, 1998**.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, § 1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application(s) for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

PRIOR FOREIGN APPLICATION(S)

Number	Country	Day/month/year filed	Priority Claimed Under 35 USC §119
97 120 988.7	Europe	December 1, 1997	YES

ELS94604721US

(3)

And I hereby appoint Richard L. Mayer (Reg. No. 22,490), Gerard A. Messina (Reg. No. 35,952), and Michelle M. Carniaux (Reg. No. 36,098) my attorneys with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful and false statements may jeopardize the validity of the application or any patent issued thereon.

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